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NEW OR LITTLE-KNOWN CRANE-FLIES FROM JAPAN (TIPULIDAE, DIPTERA)

BY CHARLES P. ALEXANDER

Some extensive collections of crane-flies from various parts of Japan have been acquired by the writer during the past few years. The most important of these was collected by Mr. Ryoichi Takahashi in the vicinity of Tokio and in the mountainous sections of the province of Saitama, about fifty miles from Tokio. Other material discussed in the present paper was received from Dr. T. Miyake and Dr. Akio Nohira. The writer expresses his thanks to these gentlemen for this material. The types of the new species are preserved in the collection of the author, para-types of several of the flies being placed in the cabinet of the American Entomological Society.

Family TIPULIDAE
Subfamily LIMNOBIINAE
Tribe *Limnobiini*

Genus **DICRANOMYIA** Stephens

Dicranomyia longipennis (Schummel)

1829. *Limnobia longipennis* Schummel, Beitr. zur Ent., i, p. 104, pl. i, fig. 2.

A female specimen from Meguro, Tokio, April 24, 1919, taken by Mr. Takahashi, vastly extends the known range of this fly, hitherto known only from Europe and North America.

Dicranomyia takahashii new species

General coloration reddish yellow, the pronotum and anterior part of the praescutum with a broad dark brown median stripe; antennae dark brownish black throughout; wings with *Sc* short, cell *1st M*₂ closed.

Male.—Length, 5.5 mm.; wing, 7.2 mm.

Female.—Length, 7 mm.; wing, 7 mm.

Rostrum slightly produced, deep reddish brown; palpi dark brown. Antennae dark brownish black throughout, the flagellar segments with long, conspicuous verticils. Head dark brown, sparsely gray pruinose, most evident on the front.

Pronotum shiny reddish yellow, dark brown above. Mesonotal praescutum reddish yellow with a conspicuous dark brown median stripe, which becomes obliterated beyond mid-length of the sclerite; remainder of the thorax reddish yellow, the pleura sparsely whitish yellow pollinose. Halteres moderately long, dark brown, the base of the stem pale. Legs with the coxae and trochanters dull yellow; femora brown, a little brighter basally; tibiae and tarsi brown. Wings with a grayish yellowish suffusion, the costal region more yellowish; stigma very indistinct, pale yellow; veins brown. Venation: *Sc* short, *Sc*₁ ending opposite or slightly beyond the origin of the sector; *Sc*₁ about equal to *r*; *Rs* about twice the length of the basal deflection of *R*₄₊₅; *r* rather long, at the extreme tip of *R*₁; cell *1st M*₂ closed, rather long, pentagonal; basal deflection of *Cu*₁ at or just beyond the fork of *M*.

Abdomen light brown, the hypopygium more yellowish.

Habitat.—Japan. Holotype, ♂, Tokio, May 22, 1919, (R. Takahashi). Allotopotype, ♀, May 26, 1919.

Dicranomyia submorio new species

General coloration shiny black, the anterior part of the vertex and the pleura silvery pruinose; fore femora brownish yellow, similar to the other femora; wings with a strong brownish tinge, the costal and basal regions yellow; *Sc*₁ very long, *Rs* and cell *1st M*₂ short; abdomen black, banded with reddish; male hypopygium with the dorsal pleural appendage a curved, chitinized arm which is acutely pointed at the tip.

Male.—Length, 5.8 mm.; wing, 6.6 mm.

Rostrum short, brown; palpi black. Antennae with the scapal segments brown, the flagellum black, the flagellar segments long-oval. Head black, the anterior part of the vertex silvery pruinose.

Mesonotum shiny black with a very sparse brownish pollen. Pleura covered with a silvery pruinosity. Halteres yellow, the knobs dark brown. Legs with the coxae black, the tips, especially those of the middle and hind coxae, brownish yellow; trochanters dull yellow; femora brownish yellow; tibiae yellowish brown, the terminal tarsal segments dark brown. Wings with a strong brownish suffusion, the costal region, the wing-base and a seam along vein *Cu* yellowish; stigma rounded oval, dark brown; indistinct and very narrow brown seams along the cord and at the origin of the sector; veins dark brown, *Sc* yellow. Venation: *Sc* short, ending opposite or slightly

before the origin of R_s ; Sc_2 very far from the tip of Sc_1 , the latter alone being longer than the sector; R_s rather short, about one-half longer than the basal deflection of R_{4+5} ; cell 1st M_2 closed, short, about equal to that portion of vein Cu_1 beyond it; basal deflection of Cu_1 at or just beyond the fork of M .

Abdominal tergites black, the caudal half of the segments reddish; sternites similar but with the black markings even more restricted; terminal abdominal segments and the hypopygium black. Male hypopygium with the ninth tergite gently concave across the posterior margin, the lateral angles not produced; ventral pleural appendage fleshy, tapering to the narrow, subacute apex; dorsal pleural appendage a curved, chitinated hook with the apex acute.

Habitat.—Japan. Holotype, ♂, Saitama, May 29, 1919, (R. Takahashi).

***Dicranomyia pseudomorio* new species**

General coloration shiny black, the anterior part of the vertex and the pleura silvery pruinose; fore femora blackish, yellow at the base; wings narrow, with a strong brown tinge, Sc_1 long, about half the length of the long sector, cell 1st M_2 narrow; abdomen black, the tergites indistinctly, the sternites distinctly, banded with reddish; male hypopygium with the dorsal pleural appendage a flattened pale arm that is expanded at the tip into a hatchet-shaped blade.

Male.—Length, 6.6 mm.; wing, 7 mm.

Rostrum reddish brown. Antennae dark brownish black throughout. The anterior part of the vertex brilliantly silvery.

Thorax and legs as in *D. submorio*, but the fore femora blackish except the bases, which are yellow; tibiae and tarsi blackish brown. Wings much narrower than in *D. submorio*, with a strong brownish tinge, the stigma more oval in outline and not so deeply colored. Venation: Sc_1 ending slightly beyond the origin of the sector, Sc_2 removed from the tip of Sc_1 , the latter alone being less than half the length of the sector; R_s long, indistinctly spurred at the origin, more than twice the length of the basal deflection of R_{4+5} ; cell 1st M_2 closed, narrow, longer than Cu_1 beyond it.

Abdominal tergites deep black, the basal segments with the caudal margin indistinctly reddish; sternites similar but with almost the posterior half of the segments reddish. Male hypopygium black, conspicuously different in structure from that of *D. submorio*; the lateral angles of the ninth tergite are produced caudad into slender arms which bear a few short hairs at the tips; pleurites stout, the inner face produced into a conspicuous arm which is expanded into a head at its distal end; ventral pleural appendage stout, the inner face produced into a point, so the whole appendage suggests the head and beak of a bird, at the base of the beak-like portion is a slightly raised papilla which bears a long, hyaline peg-like organ; dorsal pleural appendage slender, flattened-cylindrical, slightly curved, at its outer end expanded into a hatchet-shaped blackened blade.

Habitat.—Japan. Holotype, ♂, Saitama, May 29, 1919, (R. Takahashi).

The present species bears a strong superficial resemblance to *D. submorio*, but the venation and male hypopygium are very distinct.

Genus **THRYPTICOMYIA** Skuse

Thrypticomya arcuata new species

Antennae dark brownish black; thoracic dorsum pale brown without stripes, the pleura yellow; halteres black, the basal half of the stem yellow; legs with the tarsi white, except the extreme bases of the metatarsi; wings hyaline with conspicuous black veins, the wing-tip indistinctly darkened; inner end of cell *1st M*₂ arcuated, in a line with the inner end of cell *R*₃.

Male.—Length, about 5.5 mm.; wing, 6 mm.

Rostrum orange-yellow; palpi with the basal segment yellow, the terminal segments dark brown. Antennae rather long for this genus, dark brownish black, the scapal segments a little paler; flagellar segments long-oval with long, verticils arranged unilaterally. Head dark brownish black.

Pronotum yellowish. Mesonotum shiny light brown without distinct stripes, the lateral margins indistinctly more yellowish; remainder of the dorsum similar but more yellowish. Pleura light yellow. Halteres very long and slender, black, the basal half of the stem yellow. Legs with the coxae and trochanters yellow; femora dark brown, the bases yellowish; tibiae dark brown, passing into black at the tips; tarsi white, the extreme bases of the metatarsi and the claws brown. Wings hyaline with the veins very conspicuous, black; stigma oval, brown; tip of the wing very indistinctly darkened. Venation: *Sc*₁ ending just beyond the origin of *R*_s, *Sc*₂ rather far from its tip, *Sc*₁ being a little longer than the basal deflection of *Cu*₁; basal deflections of *R*₄₊₅ and *M*₁₊₂ strongly arcuated, so the inner ends of cells *R*₃ and *1st M*₂ are about on a level and far proximad of the inner end of cell *R*₅; basal deflection of *Cu*₁ beyond mid-length of the long cell *1st M*₂.

Abdomen elongate, the tergites dark brown, the sternites paler brown.

Habitat.—Japan. Holotype, ♂, Tokio, May 9, 1919, (R. Takahashi).

Genus **RHIPIDIA** Meigen

Rhipidia pulchra septentrionis Alexander

1913. *Rhipidia pulchra septentrionis* Alexander, Can. Ent., xlv, pp. 206, 207.

This northern variety of *Rhipidia pulchra* de Meijere was originally based on two alcoholic females. A male is now available and may be described as follows:

Allotype.—♂, Meguro, Tokio, Japan, April 21, 1919, (R. Takahashi).

Male.—Length, about 6 mm.; wing, 6 mm.

Very similar to the female. Antennal segments very broad but scarcely pectinate, each flagellar segment with a distinct but short pedicel. Male hypopygium pale brownish yellow, the dorsal pleural appendage heavily chitinized, black, acutely pointed; gonapophyses similarly chitinized, slightly curved.

This variety is very close to the typical form and more material of both will be needed to show their true relationship. *R. spadici-thorax* (Edwards) of the Seychelles Islands also belongs to this group of species, but is abundantly distinct from either of the Eastern forms.

Genus **LIMNOBIA** Meigen

Limnobia subnubeculosa new species

Antennae black; mesonotum reddish brown with three dark brown stripes, scutellum and postnotum dark; femora with two black bands; wings yellowish gray, clouded with brownish gray; abdominal tergites banded with brown and yellow.

Male.—Length, 7.6–7.9 mm.; wing, 9.6–10 mm.

Female.—Length, 7.4–9 mm.; wing, 8.8–10.4 mm.

Rostrum and palpi black. Antennae black, the first flagellar segment indistinctly yellowish at base, the flagellar segments with a dense white pubescence. Head dark grayish black.

Pronotum black. Mesonotum shiny reddish brown, with three dark brown stripes, the median stripe less distinct than the lateral stripes and becoming obliterated some distance before the suture; lateral stripes continued back upon the scutal lobes; a brownish spot is placed on the lateral margin of the praescutum opposite the anterior end of the lateral stripe; scutellum and postnotum dark, shiny. Pleura largely dark brown, a little more yellowish beneath the wing-root. Halteres yellow, the knobs brown, the tips again yellow. Legs with the fore coxae black, the other coxae yellowish; trochanters yellow; femora yellow with two dark brown bands, one apical, the second on the apical third of the segment, the two bands enclosing a subequal yellow band; in some specimens there is a very indistinct third band near mid-length of the femur; tibiae and tarsi brownish yellow, the apical tarsal segments brown. Wings pale yellowish gray, the costal region and the base of the wings more yellowish; brown spots at the tip of *Sc*₁ and the origin of *Rs*; extensive brownish gray clouds present on all the veins and covering most of the wing-surface. Venation: *r* far before the tip of *R*₁; basal deflection of *Cu*₁ variable in position, at, slightly beyond or even some distance before the fork of *M*.

Abdominal tergites shiny dark brown, the caudal margins of the segments yellowish; sternites dull brownish yellow, the basal portions of the segments darker, the basal sternites clearer yellow. Male hypopygium with a single pleural appendage which is strongly narrowed at the tip; gonapophyses in the form of two, pale, slightly divergent horns.

Habitat.—Japan. Holotype, ♂, Saitama, May 29, 1919, (R. Takahashi). Allotopotype, ♀, May 29, 1919. Paratopotypes, 8 ♂ ♀, May 29 to 31, 1919.

Limnobia subnubeculosa is related to *L. nubeculosa* Meigen (Europe) and *L. sciophilola* Osten Sacken (Western North America).

Genus **LIBNOTES** Westwood

Libnotes regina new species

Large (wing of female over 20 mm.); antennal flagellum pale; general coloration yellowish brown, the thoracic pleura yellow with narrow brown longitudinal stripes; femora and tibiae tipped with dark brown; wings uniformly yellow, sparsely spotted along the veins with brown.

Female.—Length, 17 mm.; wing, 21.5 mm.

Rostrum rather slender, reddish brown; mouthparts brown; palpi dark brown. Antennae with the scape dark brown; basal flagellar segments greenish yellow, the terminal segments darkened; first scapal segment a little longer than the rostrum. Head reddish brown, the vertex between the eyes reduced to a narrow linear strip.

Neck distinct. Pronotum reddish brown. Mesonotal praescutum reddish brown, darker brown medially and laterally; beyond mid-length of the praescutum is a square, median, gray area, bordered on the sides and in front by a dark brown line; scutum broadly gray medially, the lobes largely dark brown; scutellum and postnotum pale gray, the latter with the sides dark brown. Pleura yellow with strong green tints, with three narrow, dark brown longitudinal stripes, the first on the sides of the pronotum, ending above the fore coxa; the second, dorsal stripe beginning immediately dorsad of the caudal end of the first stripe, extending to beyond the wing-root; the third stripe is on the sternopleura, ending above the posterior coxa, interrupted above the mesocoxa. Halteres yellow, the knobs brown. Legs with the coxae pale, the posterior coxae strongly greenish in freshly-killed specimens; trochanters yellow; femora yellow, the tips broadly brownish black, the extreme tip on the ventral face paler brown; tibiae dull yellow, the tips narrowly dark brown; first two tarsal segments brownish yellow, the tips narrowly darkened; remainder of the tarsi dark brown. Wings with a strong yellow tinge that is practically uniform over the wing-surface; dark brown spots and dots on the veins, larger spots at the tip of Sc_1 , origin of R_s , tip of R_1 , r , along the cord and at the tips of veins Cu_1 and $2nd\ A$; small brown dots on most of the longitudinal veins; a narrow brown seam in cell Cu_1 parallel to the wing-margin. Venation: R_s slightly spurred near its origin; m about two-fifths the length of cell $1st\ M_2$.

Abdomen dull yellow, the tergites very indistinctly darker medially; first tergite with a large triangular dark brown area on either side; lateral margins of the tergites indistinctly dark brown; sternites with a dark brown lateral spot near the base of the segments, larger and more distinct on the terminal segments. Terebra of the ovipositor rather short.

Habitat.—Japan. Holotype, ♀, Tokio, May 12, 1919, (R. Takahashi).

The collector states that this species is very rare. *Libnotes regina* is a beautiful species, much larger than the brown *L. undulata* Matsumura, but smaller than the even more elegant *L. regalis* Edwards of Formosa.

Tribe *Antochini*

Genus **RHAMPHIDIA** Meigen

Rhamphidia obliterata new species

Rostrum longer than the head; antennae of the male long, extending beyond the base of the abdomen; legs yellow, the tarsi darkened; wings with the stigma dark brown, the wing-tip faintly darkened; basal deflection of R_{4+5} very short or obliterated.

Male.—Length, about 7 mm.; wing, 8 mm.

Rostrum elongate, much longer than the head, dark brown above, paler beneath; palpi dark brown. Antennae of the male very long for this genus of flies, if bent backward extending beyond the base of the abdomen; antennae dark brown, the first flagellar segment and the base of the second more yellowish; second scapal segment pale brown; flagellar segments long-cylindrical, clothed with a conspicuous, erect white pubescence; verticils sub-basal, inconspicuous, scarcely exceeding the pubescence. Head brown, the vertex rather narrow.

Pronotal scutum blackish, the scutellum yellow, dusky medially. Mesonotal praescutum pale brown with three very indistinct darker brown stripes that are entirely confluent behind; pseudosutural foveae shiny, pale chestnut-brown; scutal lobes brown, the median area yellow; scutellum and postnotum dark plumbeous brown. Pleura yellowish brown. Halteres yellowish, the knobs very indistinctly darker. Legs with the coxae brownish yellow; trochanters and femora yellow; tibiae brownish yellow; tarsi brown. Wings with a faint grayish tinge, the costal and subcostal cells more yellowish; stigma long-oval, dark brown; wing-tip faintly darkened; very indistinct darker clouds at the origin and tip of the sector; veins brown. Venation: R_s moderately elongated, strongly angulated at origin; basal deflection of R_{4+5} very short or even entirely obliterated, in the latter case veins R_{2+3} and R_{4+5} appearing to arise directly from the end of the sector; vein R_{2+3} almost straight, not bending strongly toward R_1 as in most species of the genus, at the wing-margin vein R_{2+3} being nearly equidistant from veins R_1 and R_{4+5} ; cell $1st\ M_2$ long-rectangular; basal deflection of Cu_1 at about one-third the length of cell $1st\ M_2$.

Abdomen dark brown. Male hypopygium rather elongated for this genus, the pleurites, especially, being lengthened; ninth tergite with the caudal margin gently emarginate, the lateral angles slightly produced.

Habitat.—Japan. Holotype, ♂, Saitama, May 29, 1919, (R. Takahashi).

***Rhamphidia nipponensis* Alexander**

1913. *Rhamphidia nipponensis* Alexander, Can. Ent., xlv, pp. 207 and 209.

The original description of this species was based on a single female specimen. In the present collection both sexes are represented and the male is described herewith. The species is close to the form described in this article as *R. brevioricornis* but differs in the longer antennae, the slightly different male genitalia and the usually paler coloration.

Male.—Length, 7 mm.; wing, 7.6 mm.

Rostrum of the male longer than in the female. Antennae moderately long for this genus of flies, in the male sex being nearly three times the length of the rostrum; flagellar segments long-cylindrical, the first flagellar segment nearly twice as long as the second scapal segment and subequal to the second and third flagellar segments.

Thorax pale brownish yellow, the median praescutal stripe dark brown, the lateral stripes much less distinct; scutal lobes very dark brown; postnotum usually pale with a dark brown median line, in some cases the entire median area of the postnotum being suffused.

Abdomen dark brown above, the sternites pale; hypopygium brownish yellow. Male hypopygium with the outer pleural appendage short, about two-thirds the length of the inner appendage, the tip produced into a slightly curved point, before the apex on the outer or caudal face with a very blunt, appressed tubercle.

Allotype.—♂, Tokio, May 15, 1919, (R. Takahashi). Other specimens of both sexes, Meguro, Tokio, April 25 to May 20, 1919:

***Rhamphidia brevioricornis* new species**

Antennae short, in the male sex being only about twice the length of the rostrum; general coloration dark brownish gray, the mesonotum with dark brown markings; male hypopygium with a conspicuous subapical spine on the outer face of the outer pleural appendage.

Male.—Length, 7.5–8 mm.; wing, 8.2–8.8 mm.

Female.—Length, 8.6 mm.; wing, 7.8 mm.

Rostrum much exceeding the head, black, the ventral surface paler; palpi black. Antennae dark brownish black throughout, shorter than in *R. nipponensis*, in the male being about twice the length of the rostrum; first flagellar segment short-oval, no longer than the second scapal segment, the second and third segments short-oval, the succeeding segments gradually longer; verticils of the intermediate segments about equal to the segments which bear them. Head dark gray, the vertex with a brownish longitudinal stripe; vertex between the eyes considerably narrowed.

Mesonotum dark brownish gray, the praescutum with a broad, dark brown, median stripe whose sides are parallel-sided; lateral stripes much narrower and less distinct; remainder of the mesonotum blackish. Pleura gray. Halteres yellow, the knobs a little darker. Legs with the coxae blackish; trochanters dull brownish yellow; remainder of the legs dark brown. Wings with a faint gray tinge, the stigma and costal region faintly yellow, the costal veins brown. Venation as in *R. nipponensis*.

Abdomen dark brownish black, the hypopygium a little paler brown. Male hypopygium similar to that of *R. nipponensis*, but the subapical spine on the outer face of the outer pleural appendage much longer and very conspicuous.

In some specimens, the ground color of the mesonotum is buffy-brown instead of brownish gray.

Habitat.—Japan. Holotype, ♂, Meguro, Tokio, April 29, 1919, (R. Takahashi). Allotopotype, ♀, May 5, 1919. Paratopotypes, 7 ♂ ♀, April 29 to May 20, 1919.

Tribe *Eriopterini*

Genus **ERIOPTERA** Meigen

Erioptera (Acyphona) incongruens Alexander

1913. *Erioptera (Acyphona) incongruens* Alexander, Can. Ent., xlv, pp. 288, 289.

The original description of this species was based on a unique alcoholic male which was badly broken. A female specimen is now available and may be described.

Female.—Length, 6 mm.; wing, 6.5 mm.

This interesting fly differs considerably from the same sex of *E. (A.) asymmetrica* Alexander. Legs with only the fore femora biannulate with dark brown and the rings much narrower than the yellow area between them; middle and hind legs with only the subapical brown rings. The wing pattern is much more ocellate than in *asymmetrica*, ocelliform markings occur at the origin of R_s , at Sc_1 , tip of Sc_1 and r , tips of R_1 and all the other longitudinal veins; at the end of R_s and on $r-m$ and as a broken subterminal band across the wing beyond the distal end of cell 1st M_2 ; in addition, almost all the cells of the wing have an abundance of small brown dots which are lacking only in the costal region; vein M_3 before m about as long as or slightly longer than the basal deflection of Cu_1 .

Allotype, ♀, Meguro, Tokio, April 26, 1919, (R. Takahashi).

The collector states that this species is "very rare."

Genus **MOLOPHILUS** Curtis

Molophilus triflatus new species

General coloration shiny black; legs with the trochanters and femoral bases yellowish; male hypopygium with three acicular spines, two being pleural appendages, one the penis-guard.

Male.—Length, 3.3–3.4 mm.; wing, 4.3–4.5 mm.

Female.—Length, 3.8–4.1 mm.; wing, 5–5.6 mm.

Rostrum and palpi dark brownish black. Antennae black, short in both sexes. Head black.

Thorax shiny black, the praescutum laterad of the pseudosutural foveae a little paler. Halteres dark brown, the stem pale yellow. Legs with the coxae dark brownish black; trochanters dull yellow; remainder of the legs dark brown, the bases of the femora yellowish. Wings with a uniform pale gray tinge; veins dark brown, clothed with long brown hairs. Venation: r almost in alignment with the basal deflection of $R_4 + 5$; basal deflections of M_3 and Cu_1 about equal, a little shorter than the fusion of M_3 and Cu_1 .

Abdomen black, covered with long, brownish yellow hairs. Male hypopygium with the pleural appendages projecting far caudad as two long, straight arms which are slightly curved before the acute tips; in addition, the penis-guard, pale yellow in color, projects to a nearly equal distance.

Habitat.—Japan. Holotype, ♀, Meguro, Tokio, April 28, 1919, (R. Takahashi). Allotopotype, ♂, April 24, 1919. Paratopotypes, 18 ♀ ♂, April 28 to May 12, 1919.

Molophilus trifilatus suggests the European *M. bifilatus* Verrall in the structure of the male hypopygium, but is easily told by the intense black color of the body.

Tribe *Limnophilini*

Genus **EPIPHRAGMA** Osten Sacken

Epiphragma subfascipennis new species

Antennae with the flagellum orange-yellow, the last three or four segments darkened; mesonotal praescutum with light gray stripes; halteres light yellow throughout; femora with a narrow brown annulus near the tip; wings fasciate with brown, fading into gray in the posterior wing-cells; cell 1st M_2 small; abdominal tergites broadly margined caudally with gray.

Male.—Length, about 11.5 mm.; wing, 11.7 mm.

Female.—Length, about 12.5 mm.; wing, 13.8 mm.

Rostrum brown, the dorsal surface covered with a sparse yellow pollen; palpi dark brown. Antennae with the scapal segments dark brown; flagellum light orange-yellow with only the last three or four segments faintly darkened; antennae rather elongate for this genus of flies. Head velvety brown, the anterior part of the vertex marked with yellow pollen, encircling the antennal fossae, the slight vertical tubercle and along the inner margin of the eyes.

Pronotum dark brown. Mesonotum rich brown, more saturated at the humeral regions and across the cephalic margin of the sclerite; praescutal stripes yellowish gray, the median stripe split by a capillary brown line; remainder of the mesonotum light gray, the scutellum and the median area

of the scutum more yellowish gray. Pleura dark brown with an interrupted silvery pollen, giving a spotted appearance and a more or less distinct pleural stripe. Halteres yellow. Legs with the coxae brown, sparsely gray pruinose; trochanters dull yellow, margined caudally with brownish black; femora yellow, immediately before the tip with a brown annulus; tibiae brownish yellow; tarsi brownish yellow, the terminal segments brown. Wings hyaline with a fasciate pattern suggesting that in *E. fascipennis* (Say); basal band irregular, not connected with the middle band, brownish in the anterior cells of the wing, more grayish in the posterior cells, forming ocellate circles at the arculus and the origin of the sector; the middle and apical bands are connected with one another along veins R_{4+5} and M_{1+2} ; the supernumerary cross-vein in cell *C* is connected with the basal cross-band; the marks at the ends of veins R_2 , R_3 , R_{4+5} and M_1 are all connected with one another at their proximal ends. Venation: cell R_2 deep, the veins not conspicuously divergent at the wing-margin; cell 1st M_2 comparatively small; petiole of cell M_1 about as long as the cell, slightly arcuate.

Abdominal tergites brown, the caudal margins of the segments broadly and conspicuously gray pruinose; sternites brownish yellow. Male hypopygium with the lateral gonapophyses almost straight, not notably twisted at their tips.

Habitat.—Japan. Holotype, ♂, Saitama, May 30, 1919, (R. Takahashi). Allotopotype, ♀, May 31, 1919.

***Epiphragma subinsignis* new species**

Antennae with the basal four or five segments of the flagellum orange-yellow; mesonotal praescutum reddish anteriorly, light gray behind; halteres yellow with a dark brown band at the base of the knob; legs yellow; wings with an irregular yellowish brown pattern; cell 1st M_2 large, ample; abdominal tergites narrowly margined caudally with gray.

Male.—Length, about 11 mm.; wing, 11 mm.

Rostrum yellow; palpi brown. Antennae with the scape dark brown, the basal four or five flagellar segments orange-yellow, thence passing into brown; flagellar segments shorter than in this sex of *E. subfascipennis*. Head with a conspicuous yellowish pollen, the setiferous punctures conspicuous, dark brown; a large brownish area behind the antennal bases.

Pronotum dark brown medially, more grayish laterally. Mesonotal praescutum with about the anterior half light reddish, the posterior half gray; median praescutal stripe split by a brown capillary line; remainder of the mesonotum light gray, the scutellum yellowish gray. Pleura light gray, spotted with dark brown. Halteres light yellow, a dark brown band across the base of the knobs and the apical portions of the stem. Legs light yellow, the tarsal segments a little darkened. Wings broad, hyaline, with an irregular, clear-cut pattern of yellowish brown, narrowly margined with dark brown; this consists of a cross-band at the level of the origin of the sector, extending across the wing, enclosing a hyaline spot at the spur of the sector; two smaller spots nearer the base of the wing; a broad, irregular band along the cord

narrowly connected with the band just described along vein M ; the supernumerary cross vein in cell C is usually isolated from the other markings; the small spots at the ends of veins R_2 , R_{4+5} , M_{1+2} and M_3 are isolated. Venation: cell R_2 comparatively shallow, veins R_2 and R_3 diverging slightly at the wing-margin; cell $1st\ M_2$ large, ample; petiole of cell M_1 comparatively short.

Abdominal tergites reddish brown, the caudal margins very narrowly and indistinctly gray pruinose; sternites, especially the basal segments, yellow, narrowly margined laterally with dark brown. Male hypopygium with the lateral gonapophyses almost straight, the tips considerably twisted.

Habitat.—Japan. Holotype, ♂, Saitama, May 29, 1919, (R. Takahashi). Paratype, ♂, Mt. Takao, Musashi, May 15, 1913, (T. Miyake).

Genus **LIMNOPHILA** Macquart

Limnophila (Lasiomastix) flavella new species

General coloration brownish yellow, the tarsi brown; wings yellow, a small, shiny black spot at their extreme base; apical cells of the wings pubescent.

Male.—Length, 4–5.3 mm.; wing, 5.6–6.8 mm.

Female.—Length, 5.2 mm.; wing, 5.4 mm.

Rostrum and palpi reddish yellow. Antennae yellow, the apical half of the flagellum more infuscated; antennae moderately elongated, if bent backward, extending to beyond the wing-base. Head brownish yellow, the front, anterior part of the vertex and along the inner margin of the eyes whitish silvery.

Mesonotum brownish yellow, sparsely pollinose, without stripes. Pleura pale yellow, sparsely yellow pollinose. Halteres pale, the knobs indistinctly darker. Legs yellow, the tarsi, with the exception of the metatarsi, dark brown. Wings rather narrow, light yellow; veins pale brown; a small, shiny black spot at the root of the wing; a sparse pubescence in cells $2nd\ R_1$, R_2 , R_3 , R_5 , M_1 , M_2 , M_3 , Cu_1 , and sometimes in the end of cell $1st\ A$. Venation: r far before the tip of R_1 ; Rs long; R_{2+3} longer than the basal deflection of R_{4+5} ; $r-m$ long, arcuated; petiole of cell M_1 about equal to the cell; basal deflection of Cu_1 before midlength of cell $1st\ M_2$.

Abdomen brownish yellow. Male hypopygium with the outer pleural appendage blackened at the tip, which is split into two short teeth; inner pleural appendage pale, bifid, the outer or caudal arm about four times the length of the inner arm, slightly enlarged distally; inner arm slender, bearing hairs at the apex; penis-guard strongly arcuate beyond mid length. Ovipositor with the valves very elongate, as in the closely allied *L. (L.) pilifer* Alexander, from Japan.

Habitat.—Japan. Holotype, ♂, Tokio, May 12, 1919, (R. Takahashi). Allotopotype, ♀, May 5, 1919. Paratopotypes, 1 ♂, 2 ♀, May 5 to 12, 1919.

A male from Saitama, May 29, 1919, collected by Mr. Takahashi, appears to be a variety of this species. It is equal in size to the larger specimens whose measurements are given above, differing in the darker, more reddish color, the broader wings with the cells, especially cell 1st M_2 , correspondingly widened and with the cord distinctly seamed with darker. This form may be known as *Limnophila flavella saitamae* new subspecies.

Limnophila flavella, *L. pilifer* Alexander and *L. punctum* (Meigen) of Europe form a group of closely related species, which are distinguished from the typical American species of *Lasiomastix* by the short antennæ in the male sex.

***Limnophila* (*Eulimnophila*) *tokionis* new species**

Antennae of the male sex elongated; general coloration shiny reddish brown, the thoracic pleura reddish yellow; wings brownish gray, the stigma indistinct; cell M_1 present.

Male.—Length, 6.5–7 mm.; wing, 7.8–8.7 mm.

Female.—Length, 11–11.8 mm.; wing, 9.8–10.8 mm.

Rostrum reddish brown; palpi dark brown. Antennae dark brown; in the male sex elongated, more than one-half the length of the body, the flagellar segments clothed with a long, erect pubescence. Head dark brown, with a sparse plumbeous bloom.

Pronotum reddish, the scutum dark brown medially. Mesonotal praescutum reddish, the disk more brownish, highly polished; scutum with the lobes reddish brown, the median area more yellowish; scutellum and base of the postnotum lead-color. Pleura reddish yellow. Halteres dull yellow, the knobs darker, brown. Legs with the coxae shiny yellow; trochanters dull yellow; remainder of the legs dark brown, only the femoral bases brighter. Wings brownish gray, the stigma very indistinct, of a slightly darker brown than the remainder of the wings; veins dark brown. Venation: Sc_2 long, at the tip of Sc_1 , r far from the tip of R_1 and connecting with R_2 near its origin; cell M_1 present.

Abdominal tergites dark brown, the mid-dorsal region even darker; sternites yellowish with an interrupted dark longitudinal stripe, which is sometimes obsolete, especially in the females. Male hypopygium with the outer pleural appendage subchitinized, terminating in a long, curved hook, immediately beneath which are a number of minute denticles; inner pleural appendage fleshy, tapering gradually to the blunt apex which is tipped with a single powerful bristle.

Habitat.—Japan. Holotype, ♂, Tokio, April 28, 1919, (R. Takahashi). Allotopotype, ♀, May 27, 1919. Paratopotypes, 3 ♂, 2 ♀, April 24 to May 15, 1919.

Tribe *Hexatomini*Genus **ERIOCERA** Macquart**Eriocera longifurca** new species

General coloration black, dusted with light gray; mesonotal praescutum with three black stripes; legs black; wings yellowish, the cross-veins heavily margined with brown; ovipositor of the female with the tergal valves long and straight, the sternal valves inconspicuous.

Male.—Length, about 11 mm.; wing, 12.5 mm.

Female.—Length, 17 mm.; wing, 13.2 mm.

Rostrum and palpi black. Antennae short in both sexes, black. Head gray pruinose.

Mesonotum light gray pruinose, the praescutum with three blackish stripes, the median stripe broad in front, rapidly narrowed behind and becoming obliterated before the suture, indistinctly split by a capillary pale marking; lateral stripes narrow; scutum gray, each lobe with two black markings; scutellum and postnotum gray. Pleura gray. Halteres very short, the stem pale, darker at the extreme base, the knobs brown. Legs with the coxae gray pruinose; remainder of the legs black. Wings with a faint yellow tinge, the costal and subcostal cells more saturated; stigma small, oval, dark brown; broad brown seams at the origin of the sector, along the cord, outer end of cell 1st M_2 , apex of the wing and along veins Cu and 2nd A ; veins dark brown, Sc yellow. Venation: r inserted at about mid length of vein R_2 , R_{2+3} very short, about one-half longer than $r-m$; cell 1st M_2 long and narrow, longer than the veins issuing from it; basal deflection of Cu_1 before mid-length of cell 1st M_2 .

Abdomen black, sparsely gray pruinose, the posterior margins of the segments narrowly pale, more distinct on the sternites of the female. Male hypopygium not conspicuously enlarged. Ovipositor with the tergal valves long and straight, lying parallel to one another, transverse, blackened; sternal valves very short, not projecting beyond the base of the tergal valves; ninth tergite opaque, dusted with gray pollen.

Habitat.—Japan. Holotype, ♂, Saitama, May 31, 1919, (R. Takahashi). Allotopotype, ♀.

Tribe *Pedicinii*Genus **TRICYPHONA** Zetterstedt**Tricyphona kuwanai** Alexander

1913. *Tricyphona kuwanai* Alexander, Can. Ent., xlv, pp. 318, 319.

The male sex of this bizarre fly has not been described. It may be distinguished from the female by the following characters:

Allotype.—♂, Meguro, Tokio, Japan, April 14, 1919, (R. Takahashi).

Male.—Length, 12.5 mm.; wing, 13.4 mm.

Antennae very small, not greatly exceeding the head. Head sparsely gray pruinose. Cell 1st M_2 is sometimes closed by the presence of a medial cross-vein which may be present in one wing and lacking in the other of the same individual; when present it lies transversely across the wing, connecting M_{1+2} with M_3 .

Male hypopygium with the pleurites stout; pleural appendages two in number, the outer appendage short and rounded, the surface covered with numerous stout bristles and with three long setae; inner pleural appendage with the inner face produced into a long, slender arm, the apex of which bears a few long setae, the caudal face set with about a dozen powerful black spines. Gonapophyses flattened, narrowed to the beak-like apex.

***Tricyphona trispinosa* new species**

Similar to *T. kuwanai*; size smaller, wing of the male under 11 mm.; wings without a row of costal black dots; a dusky seam along the cord and another extending obliquely across the wing-tip from r to the end of vein M_3 , m present, oblique in position; inner pleural appendage of the male hypopygium with but three spines.

Male.—Length, about 9.5 mm.; wing, 10.8 mm.

Generally similar to *Tricyphona kuwanai*, differing as follows: The size is smaller, but the general coloration of the body and the peculiar pattern of the mesonotum is almost the same in the two species. Wings with the yellow subcostal band paler yellow, broader and including more of the costal cell, the remainder of the costal cell unicolorous, not spotted with black as in *kuwanai*; the brown band which begins at r and runs obliquely across the wing, in the present species continues across the fork of M_{1+2} and attains the wing-margin at the end of vein M_3 ; the m cross-vein is present, very oblique in position and lying far out toward the tip of the wing, occupying the path of the dusky band just described; a broad dusky seam along the cord, extending from $r-m$ to the fork of Cu . Male hypopygium generally similar to *T. kuwanai*, but the inner pleural appendage with but few (three in the type) chitinated spines.

Habitat.—Japan. Holotype, ♂, without exact locality or date, possibly Kyoto (Akio Nohiro, collector's number 28).

Subfamily CYLINDROTOMINAE

Genus **LIOGMA** Osten Sacken

***Liogma kuwanai* Alexander**

1913. *Liogma kuwanai* Alexander, Can. Ent., xlv, pp. 321, 322.

The female sex of *Liogma kuwanai* has not been described.

Allotype.—♀, Meguro, Tokio, Japan, April 8, 1919, (R. Takahashi).

Female.—Length, about 12 mm.; wing, 11.5 mm.

The female sex differs from the male as follows:

Antennae shorter with the flagellar segments less distinctly serrate. Abdomen shorter and stouter, the distal segments more widened. Ovipositor with the valves rather long for a member of the *Cylindrotominae* but still fleshy and pubescent.

The head and thorax, in both sexes of the species, are dull gray pruinose, conspicuously different from the shiny black coloration of the other species of the genus. The praescutal interspaces are vermiculately pitted, producing a rugulose effect similar to that of the vertex.

Subfamily TIPULINAE

Tribe *Tipulini*

Genus **TIPULA** Linnaeus

Tipula naviculifer new species

General coloration gray, the mesonotal praescutum with four dark brown stripes; antennae unicolorous; legs black, the femoral bases yellow; wings light yellow with a sparse brown cross-banded pattern; male hypopygium with a conspicuous boat-like appendage on the posterior margin of the eighth sternite.

Male.—Length, about 18 mm.; wing, 22.5 mm.

Frontal prolongation of the head light gray; nasus slender; palpi dark brown, the terminal segment passing into yellowish brown. Antennae with the scapal segments dull yellow; flagellum dark brownish black; antennae of moderate length, the flagellar segments subcylindrical, the basal enlargement not conspicuous. Head light gray, the anterior part of the vertex faintly tinged with reddish; a very indistinct dark brown median line.

Mesonotal praescutum tawny yellow, with four very distinct dark brown stripes, the intermediate pair separated from one another by a narrow line of the ground color; lateral margins and the humeral region a little more grayish; scutum brownish gray; scutellum and postnotum dull gray with a distinct black, interrupted median stripe on both sclerites. Pleura clear blue-gray, the dorso-pleural membranes dull buffy yellow. Halteres dull yellow, the knobs blackish, tipped with yellow. Legs with the coxae gray; trochanters dull yellow; remainder of the legs black with a little less than the basal half of the femora yellowish; legs long and slender, the metatarsi longer than the tibiae. Wings with a faint yellow tinge, much more saturated in the costal and subcostal cells and at the wing-base; stigma bicolorous, dark brown, with a large yellow blotch at the proximal-cephalic end; sparse brown markings at the origin of *Rs*; at the tip of *Rs*; the fork of *Cu*; paler grayish clouds near the wing-tip in cell *R*₂; an interrupted band across the wing extending from the origin of *Rs* to the caudal margin of the wing in the 1st *Anal* cell; veins dark brown. Venation: *R*₂ persistent; cell *R*₂ broad; petiole of cell *M*₁ very short.

Abdominal tergites yellow with a very broad black median stripe that broadens out behind, on segments five to nine including the entire segments; caudal margins of segments two to four indistinctly pale; sternites yellow, on the fifth and succeeding segments passing into blackish; the boat-shaped appendage on the eighth sternite yellow. The abdominal segments before the hypopygium are very short and crowded, tergites six to eight being very narrow; male hypopygium moderately incrassated; ninth tergite ending in two very broad, flattened lobes, their caudal margins subtruncate, the lobes separated from one another by a deep, narrow split; eighth sternite produced into a conspicuous, arcuate, boat-shaped appendage which is conspicuously fringed with yellow hairs.

Habitat.—Japan. Holotype, ♂, Saitama, May 29, 1919, (R. Takahashi).

Tipula trupheoneura new species

General coloration light gray; nasus bifid at apex; antennae dark brown, the second scapal segment yellow; wings hyaline, cross-banded with brown; tip of vein R_2 obliterated; abdomen yellowish at the base, the remaining segments darker, the sternites heavily pruinose.

Female.—Length, about 22 mm.; wing, 18.5 mm.

Frontal prolongation of the head rather long, dark gray; nasus very broad and slightly but distinctly bifid at its apex; mouthparts large; palpi dark brown, the incisures pale. Antennae with the first scapal segment elongate, dark brown, sparsely dusted with gray, the ventral face and apex yellowish; second scapal segment bright yellow; remainder of the antennae dark brown, the flagellar segments in this sex cylindrical. Head gray, very indistinctly infuscated on the vertex.

Pronotum gray with three darker markings. Mesonotal praescutum gray with four brown stripes, the intermediate pair not attaining the suture and separated from one another by a very narrow gray line; lateral stripes indistinctly bisected behind; each scutal lobe with two brown markings; remainder of the mesonotum light blue-gray with a very delicate brownish median line extending from the scutum to the postnotum. Pleura clear blue-gray. Halteres yellow, the knobs dark brown. Legs with the coxae blue-gray; trochanters brownish yellow; femora reddish yellow, the apical third (hind legs) or half (fore legs) dark brown; tibiae brown, the tips broadly blackened; tarsi black. Wings whitish hyaline, the costal and subcostal cells and the wing-root bright yellowish; stigma dark brown; a heavy brown cross-banded pattern including the wing-apex in the outer ends of cells R_2 , R_3 , R_5 and all of M_1 and 2nd M_2 , except a pale spot in the base of the latter; a broad band along the cord from the dark brown stigma; a broad, somewhat paler band across the middle of cells R , M , Cu and the end of 1st A ; 2nd $Anal$ cell and the base of the 1st $Anal$ cell similarly darkened; the broad hyaline cross-band beyond the stigma is complete, including practically all of cell 1st M_2 and extending clear across the wing; veins dark brown, Sc and R yellow. Venation: tip of R_1 atrophied beyond r ; the strong macrotrichiae of R_1 con-

tinued across r ; tip of R_2 atrophied, leaving only a slight spur beyond r ; petiole of cell M_1 short; $m-cu$ distinct.

Abdomen with the basal tergites gray; tergite two and the base of three yellow, dark brown medially; remaining tergites dull black, the caudal margin of the segments narrowly pale, the posterior lateral margins broadly silvery pruinose; basal sternite blackened apically; second sternite and the base of the third yellowish; segments four to eight pale brown, with a broad dark median stripe which is almost hidden by a heavy silvery pollen that covers the segments. Ovipositor with the dorsal shield shiny black, only the apex paler; dorsal valves of the ovipositor straight, slender, greatly exceeding the short sternal valves.

Habitat.—Japan. Holotype, ♀, Saitama, May 31, 1919, (R. Takahashi).

***Tipula serricauda* Alexander**

1914. *Tipula serricauda* Alexander, Can. Ent., xlv, pp. 237, 238.

The original description of the present species was based on alcoholic females. A male *Tipula* is at hand which is evidently this sex of *serricauda* and the specimen is herewith made the allotype.

Allotype.—♂, Meguro, Tokio, Japan, May 10, 1919, (R. Takahashi).

Male.—Length, 15.5 mm.; wing, 20.5 mm.

Similar to the female sex, differing as follows:

Antennae short, scarcely longer than in the female. Abdomen dark reddish brown, the terminal segments blackish. Male hypopygium with the ninth tergite short, deeply impressed medially; ninth sternite with the caudal margin trifold; eighth sternite unarmed.

***Tipula serridens* new species**

General coloration light gray, the praescutum with four darker gray stripes which are margined with dark brown; antennal flagellum unicolorous; wings subhyaline, banded with brown; ovipositor with the tergal valves powerful, transverse, the outer margin serrate, the sternal valves subatrophied.

Female.—Length, about 21 mm.; wing, 17 mm.

Frontal prolongation of the head light gray; nasus short and stout; palpi dark brown. Antennae short, the first segment dark basally, the apex dull yellow; second segment dull yellow; first flagellar segment pale brown at the base, the remainder of the antennae dark brown. Head light ash-gray with a very indistinct, delicate, brown median line on the vertex; vertical tubercle low but evident.

Mesonotal praescutum light ash-gray, with four darker gray stripes which are margined with dark brown, the intermediate stripes narrowed behind and becoming obsolete before the suture; lateral stripes broad and with the brown margins very distinct; scutum light ash-gray, the lobes with two darker

gray areas, the more cephalic of which are margined with brown; scutellum and postnotum light gray with a very indistinct brown median line. Pleura clear blue-gray. Halteres dull yellow, the knobs scarcely darkened. Legs with the coxae gray; trochanters dull yellow, the posterior trochanters faintly pruinose; femora brownish yellow with a broad darker brown subapical ring, the extreme tips very slightly paler; tibiae dull brownish yellow, tipped with brown; tarsi dark brown, the bases of the metatarsi brownish yellow. Wings whitish subhyaline, with a pale brown pattern; cells *C*, *Sc* and the wing-base strongly yellow; stigma oval, dark brown; wing apex darkened, including the end of cell *R*₂, the apical half of *R*₃, all except the base of *R*₅, all of *M*₁ and 2nd *M*₂ and the ends of 1st *M*₂ and *M*₄; darker brown marks at the origin and tip of *Rs* and along *Cu*₁ and *Cu*₂; faint brownish gray clouds along the cord, across the wing at about mid-length of the basal cells, including about all of cell *R*; 2nd *Anal* cell similar; a large hyaline spot near the end of cell *M*. Venation: cell 1st *M*₂ long and narrow, pentagonal; petiole of cell *M*₁ short; *m-cu* punctiform.

Abdominal tergites with the first segment dull gray; the following segments reddish buff with three broad dark brown stripes, which become broadened out on the terminal segments to include all of segment seven and the posterior half of segment six; lateral margins of the segments pale; impressed basal areas pale brown, inconspicuous; sternites similar, the three basal segments reddish brown, the others dark brown with the caudal margin more reddish. Ovipositor of the *arctica* type, the tergal valves rather slender, the outer margin with acute, appressed teeth; sternal valves minute, subatrophied.

Habitat.—Japan. Holotype, ♀, Saitama, May 29, 1919, (R. Takahashi).

***Tipula terebrina* new species**

General coloration gray, the mesonotum with four dark brown stripes, of which the lateral pair are paler than the intermediate pair; antennae indistinctly bicolorous; vertex with a dark brown median line; wings brownish gray, with a broad hyaline band beyond the stigma extending caudad and proximad through cell 1st *M*₂.

Female.—Length, about 20 mm.; wing, 17.7 mm.

Frontal prolongation of the head reddish yellow, grayish medially above; nasus moderately slender; palpi with the first segment pale, the remaining segments brown. Antennae with the first segment dark, the second segment dull yellow; flagellar segments indistinctly bicolorous, the basal enlargement of the individual segments dark brown, the remainder slightly paler brown. Head gray, the vertex with a conspicuous dark brown median line which is narrowed to a point behind.

Pronotum gray, with a dark brown mark above; scutellum light yellow. Mesonotal praescutum gray with four dark brown stripes, the intermediate pair separated from one another by a somewhat narrower and paler brown stripe; lateral stripes pale, the lateral margin tending to be obliterated; scutum light gray with the lobes very indistinctly darker medially; scutellum testa-

ceous with an indistinct darker median line; postnotum pale, light gray pruinose. Pleura light gray. Halteres dull brownish yellow, the knobs darker brown. Legs with the coxae light gray pruinose; trochanters dull yellow, the posterior trochanters pruinose; femora brownish yellow, the tips broadly dark brown; tibiae yellowish brown; tarsi dark brown. Wings with a strong brownish gray tinge, the base of the wing and cell *C* dull yellow, cell *Sc* and the space immediately behind vein *Cu* brighter yellow; stigma dark brown; a broad hyaline band beyond the stigma extending from the costal margin through cell *1st M*₂, including the end of cell *2nd R*₁, the basal two-thirds of *R*₂, almost the basal half of cell *R*₃, about the basal third of *R*₅ and practically all of cell *1st M*₂; in addition to this, an obliterative spot in cell *1st R*₁, before the stigma, and indistinct pale areas in the end of cell *R* and the bases of cells *2nd M*₂ and *M*₄; veins dark brown. Venation: cell *1st M*₂ small, pentagonal.

Abdominal tergites yellowish brown laterally, with a broad dark brown median stripe that is interrupted basally by broad smooth gray bands, on each side of which are rectangular dark brown impressed areas, these located on segments two to seven; sternites generally similar, the basal segments pale buff, the apical segments more grayish; an interrupted brown median stripe on the intermediate sternites; the dark brown impressed areas are found on sternites three to seven. Ovipositor with a long, shiny, dorsal shield, the long, slender tergal valves lying transversely, their outer margin not serrated; sternal valves short and high, extending to about one-third the length of the tergal valves, their tips truncated. The structure of the ovipositor indicates the manner in which the highly specialized types found in the *arctica* group of the genus *Tipula* have been derived.

Habitat.—Japan. Holotype, ♀, Meguro, Tokio, April 28, 1919, (R. Takahashi).

***Tipula dichroistigma* new species**

Mesonotum shiny black, the praescutal interspaces gray pruinose; antennae of the male elongated; pleura gray pruinose; wings yellowish gray, the tips conspicuously darkened; stigma bicolorous, the basal half yellow, the apical half dark brown.

Male.—Length, about 14 mm.; wing, 19.1 mm.

Female.—Length, about 19 mm.; wing, 18.8 mm.

Frontal prolongation of the head rather short, dull yellow, above light gray pruinose; nasus slender; palpi pale brownish yellow. Antennae of the male sex very long, if bent backward extending to near mid-length of the abdomen; first three segments yellow, remainder of the antennae black; in the female, the antennae are short, about the basal half yellowish, the terminal half of the flagellum brown; male antennae with short verticils on the inner face, long, second verticils on the outer face of the segments. Head clear light gray.

Pronotum black, grayish pruinose. Mesonotal praescutum shiny black, the interspaces gray pruinose; remainder of the dorsum shiny black, the

scutum sparsely, the postnotum more heavily, pruinose. Pleura clear gray, the dorso-pleural membranes light yellow. Halteres slender, pale brown, the knobs a little darker. Legs with the coxae brownish yellow, gray pruinose; trochanters yellow; femora dull yellow, the tips broadly blackened; tibiae dark brown, the tips black; tarsi black. Wings with a faint yellowish gray tinge, the costal and subcostal cells and the wing-base more yellowish; stigma bicolorous, the proximal half light yellow, the distal half abruptly dark brown; wing-tip strongly infuscated, including cells R_2 , R_3 , R_5 , M_1 , 2nd M_2 and the margin of M_4 . Venation: tip of R_2 persistent; $m-cu$ short but distinct.

Abdomen with the basal tergites reddish yellow, the male sex with the fourth and succeeding tergites darker, on the sixth to ninth tergites almost black with the caudal margins narrowly, the lateral margins more broadly pale; sternites with the eighth and ninth segments only black. In the female the dark coloration begins on about the third segment; dorsal shield of the ovipositor shiny black. Male hypopygium simple in structure, the ninth tergite flattened, shiny black, the caudal margin with a U-shaped incision, the lateral lobes thus formed rounded; eighth sternite practically unarmed. Ovipositor with the dorsal shield rather short, the sternal valves longer than the tergal valves, their tips in a position of rest almost attaining the tips of the tergal valves in a position of rest.

Habitat.—Japan. Holotype, ♂, Saitama, May 30, 1919, (R. Takahashi). Allotopotype, ♀, in copula with the type, pinned on the same pin.

***Tipula saitamae* new species**

General coloration yellow; mesonotal praescutum yellowish gray with four darker gray stripes; antennae bicolorous; wings yellow, the costal region brighter; legs yellow, the tarsi brown.

Female.—Length, about 20 mm.; wing, 19.3 mm.

Frontal prolongation of the head dark gray, more brownish laterally and beneath; nasus long and slender; palpi dark brownish black. Antennae with the scape yellow, the first flagellar segment dark brown with the apical half yellowish; basal flagellar segments bicolorous, the terminal segments more uniformly colored; flagellar segments long-cylindrical, slender, the basal swelling distinct, with long verticils. Head yellowish gray, the vertex rather narrow between the eyes.

Pronotum conspicuous yellow. Mesonotal praescutum dull yellowish gray with four slightly darker gray stripes, the intermediate pair narrow, widely separated; lateral margins of the sclerite more yellowish; scutum similar, the lobes marked with darker gray; scutellum and postnotum with a strong, dull yellow pollen. Pleura dull yellow. Halteres slender, pale brown. Legs with the coxae dull yellowish buff; trochanters dull yellow; femora and tibiae brownish yellow, the tips not darkened; metatarsi similar, the tips dark brown; apical tarsal segments dark brown. Wings with a very strong yellow tinge, much brighter in the costal and subcostal cells; stigma brown; veins brown, Sc , R and Cu more yellowish; obliterative streak extending into the

base of cell M_4 . Venation: cell R_2 narrowed at its base; cell 1st M_2 short, pentagonal; $m-cu$ obliterated.

Abdominal segments brownish yellow, segments seven and eight dark brown. Ovipositor with the tergal valves destroyed in the unique type, the sternal valves very dark colored at the base, rather slender and tapering to the acute tips.

Habitat.—Japan. Holotype, ♀, Saitama, May 30, 1919, (R. Takahashi).

Tipula insulicola Alexander

1914. *Tipula insulicola* Alexander, Can. Ent., xli, p. 211.

The original description of this species was based on a single alcoholic female from the vicinity of Tokio. In the present collection the male sex was represented by three specimens, one of which is here made the allotype.

Allotype.—♂, Meguro, Tokio, Japan, May 14, 1919, (R. Takahashi).

Male.—Length, 11.5 mm.; wing, 11.3 mm.; antenna, about 5 mm.

Similar to the female, differing as follows: Antennae elongate, if bent backward extending to beyond the base of the abdomen. Male hypopygium with the ninth tergite very high, the caudal margin produced into a long, compressed blade whose margins spread out laterally, this conspicuous median lobe being generally similar to the condition found in the Nearctic *T. annulicornis* Say, to which species the present insect is obviously allied; eighth sternite unarmed.

Genus **NEPHROTOMA** Meigen

Nephrotoma virgata (Coquillett)

1898. *Pachyrhina virgata* Coquillett, Proc. U. S. Nat. Mus., xxi, p. 306.

1914. *Pachyrhina virgata* Alexander, Can. Ent., xli, pp. 163, 164.

1916. *Pachyrhina virgata* Edwards, Ann. Mag. Nat. Hist., ser. 8, xviii, p. 266.

1917. *Pachyrhina virgata* Riedel, Arch. für Naturgesch., Abt. A, 5, p. 116.

Coquillett had but a single male specimen before him at the time of describing this species. The female sex may here be described.

Allotype.—♀, Meguro, Tokio, Japan, May 2, 1919, (R. Takahashi).

Length, about 15 mm.; wing, 14 mm.

Similar to the male, differing as follows:

Antennae much shorter, the base of the first flagellar segment pale. Abdomen with the dorsal median stripe very broad, on the second and third segments the base and apex of the segments narrowly pale, on segments four to seven with only the lateral and caudal margins pale. Valves of the ovipositor long and slender.

Nephrotoma virgata is apparently the commonest species of the genus in Japan. Specimens are before me from the following unrecorded stations:

Kioto, May 31 to July, (Akio Nohira).

Meguro, Tokio, April 24 to May 2, 1919, (R. Takahashi).

Saitama, May 29, 1919, (R. Takahashi).

***Nephrotoma contrasta* new species**

General coloration yellow, the occiput with a large black spot; mesonotal praescutum with three black stripes; scutal lobes black; scutellum and postnotum mostly yellow; pleura heavily marked with black; wings yellow, a grayish brown seam at the end of *Rs* and another at the wing-tip; abdominal tergites trivittate with black.

Male.—Length, about 11 mm.; wing, 13.2 mm.

Female.—Length, 16.5 mm.; wing, 15.8 mm.

Frontal prolongation of the head yellow, the dorsum black; palpi pale brown, the terminal segments darker. Antennae with the first segment short, reddish brown; second segment dark brown; flagellum brownish black throughout, the segments rather deeply incised beyond the basal swelling. Front light yellow with a small brownish median spot; vertex orange-yellow, a small dark brown spot adjoining the inner margin of the eye; occiput with a very large rounded black mark which passes caudad to the cervical sclerites and ventrad upon the genae.

Pronotum light yellow, the sides broadly black. Mesonotal praescutum yellow with three black stripes, at the anterior end of the lateral stripes with an opaque velvety-black spot; suture black, this mark extended cephalad along the lateral margin of the praescutum, reaching to almost opposite the anterior end of the lateral stripes; scutum yellow, the lobes very extensively black; scutellum yellowish testaceous; postnotum yellow, the caudal margin with a pair of rounded black spots. Pleura yellow, heavily spotted with black, the largest marks on the mesosterna and mesopleura. Halteres brown, the knobs yellow. Legs with the fore coxae largely blackish on the outer face, the other coxae pale with a large basal black mark; trochanters dull yellow; femora brownish yellow, the tips indistinctly darker; in the female the femoral tips are broadly black, especially those of the fore legs where only the base of the segment is pale; tibiae pale brown, the tips broadly blackened; tarsi black. Wings with a strong yellowish tinge, the costal and subcostal cells yellow, the anal cells more grayish; stigma oval, dark brown; wing-tip and a cloud on the basal deflection of R_{4+5} and *r-m* grayish brown; veins dark brown. Venation: petiole of cell M_1 short or punctiform.

Abdominal tergites dull yellow with a broad black median stripe, on segments seven to nine suffusing the entire sclerites; sternites dull yellow. In the female, the dorsal median stripe is very broad and the lateral margins are distinctly blackish; sternites yellow with a dark brown median line, beginning on the second sternite as a capillary line which widens out behind, on the fifth and succeeding sclerites including most of the sternites. Hypopygium

black, the appendages pale brown. Ovipositor reddish yellow, short and stumpy, the tergal valves short-triangular; sternal valves short and blunt, the tips down-curved.

Habitat.—Japan. Holotype, ♂, Saitama, May 29, 1919, (R. Takahashi). Allotype, ♀, Meguro, Tokio, May 24, 1919, (R. Takahashi). Paratopotype, ♀, May 30, 1919.

Nephrotoma contrasta is readily told from the closely related *N. pullata* (Alexander) by the yellowish scutellum and postnotum, the punctiform or short petiolate base of cell M_1 and other characters.

***Nephrotoma palloris* (Coquillett)**

1898. *Pachyrhina palloris* Coquillett, Proc. U. S. Nat. Mus., xxi, p. 306.

1914. *Pachyrhina palloris* Alexander, Can. Ent., xlv, pp. 159, 160.

1917. *Pachyrhina palloris* Riedel, Arch. für Naturgesch., Abt. A, 5, p. 116.

1918. *Pachyrhina palloris* Riedel, Ann. Mus. Nat. Hung., xvi, p. 320.

The male sex may be separated from the female as follows:

Allotype.—♂, Meguro, Tokio, Japan, May 26, 1919, (R. Takahashi).

Similar to the female sex, differing as follows:

Antennae rather elongate, if bent backward extending about to the base of the abdomen, the three basal segments yellow, the flagellum indistinctly bicolorous, the basal enlargement of the segments being a slightly darker brown than the pedicels.

Mesonotal praescutum with the median stripe indistinctly bifid, especially anteriorly. A small isolated opaque black spot opposite the anterior ends of the lateral stripes.

Abdominal tergites trivittate with black. Male hypopygium with the ninth tergite slightly tumid, the caudal margin very broadly emarginate; eighth sternite very gently emarginate.

***Nephrotoma geminata* new species**

Antennae with the scape yellow, the flagellum dark brown; occipital area small, brown; mesonotum yellow, the praescutum with three black stripes, a faint isolated opaque spot opposite the anterior ends of the lateral stripes; scutellum and postnotum yellow, the latter with two large black spots on the caudal margin; wings pale brownish yellow, the stigma pale; abdomen reddish yellow, the tergites narrowly trivittate with black.

Male.—Length, about 11.5 mm.; wing, 10.3 mm.

Female.—Length, 14 mm.; wing, 11.6 mm.

Frontal prolongation of the head short, dull yellow, the dorso-median area dark brownish black; palpi pale brown. Antennae with the two basal segments yellow, the flagellum dark brown; flagellar segments in the male sex moderately elongated, feebly incised beyond the basal swelling. Front and anterior part of the vertex sulphur-yellow, remainder of the head orange-

yellow; a faint brown spot adjoining the inner margin of the eyes behind the antennal bases; occipital area small, brown, faintly shiny.

Pronotum yellow, the lateral portions only slightly darker. Mesonotal praescutum yellow with three shiny black stripes; laterad of the anterior ends of the lateral stripes a faint isolated opaque black spot; scutum with the lobes reddish black, the median area sulphur yellow; scutellum and postnotum mostly sulphur yellow, the latter with a pair of large rounded black spots along the caudal margin. Pleura yellow, the mesosternum between the fore and middle and middle and hind coxae and a spot before the halteres reddish brown or blackish. Halteres light brown, the ends of the knobs sulphur yellow. Legs with the coxae and trochanters orange-yellow; femora reddish yellow, the tips indistinctly darker on the outer face; tibiae brownish yellow, the tips darkened; tarsi dark brown. Wings with a pale brownish yellow tinge, the costal and subcostal cells and the stigma a little more strongly yellow; veins dark brown. Venation: cell M_1 narrowly sessile; basal deflection of Cu_1 at the fork of M .

Abdomen reddish yellow, the tergites trivittate with black, the stripes very narrow, interrupted at the bases of the segments; segments of the abdomen clothed with conspicuous yellow hairs. Male hypopygium with the ninth tergite nearly as in *N. repanda*, outer pleural lobes convex, scoop-like, the tips broadly rounded. Ovipositor with the tergal valves straight, slender.

Habitat.—Japan. Holotype, ♂, Ichikawa, Chiba-ken, May 17, 1919, (R. Takahashi). Allotopotype, ♀.

Nephrotoma geminata is closely related to *N. palloris* (Coquillett), but differs considerably from this latter species in the details of structure and coloration.

***Nephrotoma bifusca* new species**

Antennae with the basal segments pale; mesonotum yellow, the praescutum with three broad black stripes; scutellum and postnotum yellow, blackish laterally; pleura dull yellow, the mesosternum brownish black; wings pale yellow, with a brown band at the cord and the tip largely brown; abdominal tergites trivittate with black.

Female.—Length, about 18 mm.; wing, 13.2 mm.

Frontal prolongation of the head dull yellow, the dorsum shiny brown; nasus slender; palpi brown, the two intermediate segments dull yellow. Antennae with the basal segments dull yellow, on the fifth and succeeding segments with the basal enlargement brown producing an indistinct bicolorous effect. Head orange-yellow, the shiny occipital area small and pale brown.

Pronotum dull yellow. Mesonotal praescutum yellow with three very broad black stripes, the interspaces very narrow; an oval velvety black spot laterad of the anterior ends of the lateral stripes; ends of the suture velvety black; scutum black with only the narrow median area yellow; scutellum dull yellow, brownish black laterally; postnotum yellow medially, the lateral and posterior portions broadly black. Pleura dull yellow, the mesosternum

brownish black. Halteres dull yellow, the knobs brown with the tips yellowish. Legs yellow, the tibiae narrowly tipped with dark brown; tarsi dark brown. Wings pale yellowish subhyaline, cell *Sc* dark brown; stigma oval, dark brown; a distinct broad brown seam along the cord extending from the stigma along the cord, following the deflection of Cu_1 and Cu_2 to the margin; wing-tip broadly infuscated; longitudinal veins beyond the cord narrowly seamed with brown; veins dark brown. Venation: cell M_1 very short-petiolate.

Abdominal tergites yellow, with a broad black interrupted dorso-median stripe, each segment with a triangular black area with the narrow end directed cephalad; a shiny basal strip light yellow; lateral margins of the segments broadly black; eighth tergite entirely black; sternites dull yellow. Ovipositor with the valves rather long, acute.

Habitat.—Japan. Holotype, ♀, Kyoto, May 27, 1914, (Akio Nohira).

In the pattern of the wings *Nephrotoma bifusca* resembles the European *N. quadrifaria* (Meigen).